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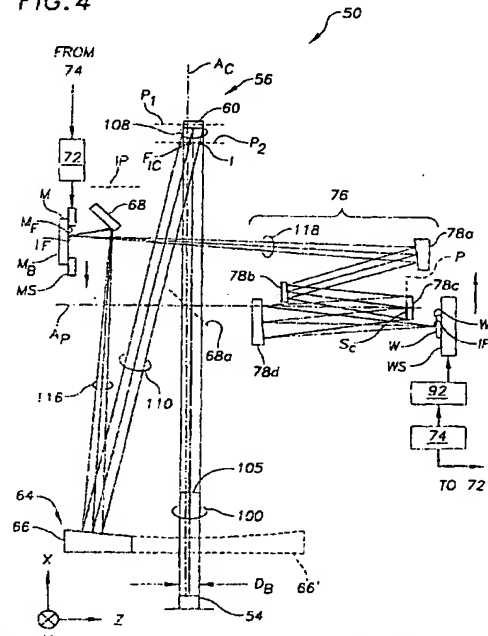
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(54) Illumination system and exposure apparatus and method

(57) An illumination system and exposure apparatus and method involving illuminating a surface over an illumination field (IF) having an arcuate shape. The illumination system comprises a light source (54) for providing a light beam (100), and an optical integrator (56). The optical integrator comprises a first reflective element group (60) having an array of first optical elements (E) each having an arcuate profile corresponding to the arcuate shape of the illumination field. Each of the first optical elements has an eccentric reflecting surface (RS_E) comprising an off-axis section of either a spherical surface (S) or an aspherical surface (AS_E). The array of first optical elements is designed so as to form a plurality of arcuate light beams (108) capable of forming a plurality of light source images (I). The illumination system further includes a condenser optical system (64) designed so as to condense said plurality of arcuate light beams to illuminate the surface over the arcuate illumination field in an overlapping manner.

FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 669 708 A (TANITSU OSAMU ET AL) 23 September 1997 (1997-09-23) * column 42, line 24 - column 44, line 44; figures 50-52 *	1-5,38, 41,43,45	G03F7/20
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The present search report has been drawn up for all claims			
Place of search: THE HAGUE		Date of completion of the search: 21 February 2001	Examiner: HERYET, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date C : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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EP 99 10 3684

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.8)
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 448 (P-1594), 17 August 1993 (1993-08-17) -& JP 05 100097 A (NIKON CORP), 23 April 1993 (1993-04-23) * abstract; figures *	51-55	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 February 2001	Examiner HERYET, C
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, co-responding document</p>			

EPF FORM 1503 (12/92) (P04001)



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**LACK OF UNITY OF INVENTION
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Application Number
EP 99 10 3684

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-43, 45

Illumination system with an array of reflecting elements each having an arcuate profile corresponding to the arcuate shape of the illumination field.

2. Claims: 44, 46-50

Illumination system and means for varying intensity distribution at pupil of projection system.

3. Claims: 51-55

Illumination system and means for varying intensity distribution at the photosensitive substrate.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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